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Rotifer fauna from Venezuela

by

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Abstract

The rotifer fauna of Venezuela is analysed in the light of previously existing literature and observations, and the unpublished results of authors. A total of 268 taxa belonging to 44 genera are recorded. The genera *Lecane, Brachionus* and *Trichocerca* are the most diverse. Taxocoenosis consists of cosmopolitan (68 %), pantropical (19 %), neotropical (11 %) and neartic (2 %) taxa. The proportion of endemic taxa is comparable to other tropical regions where endemism of genus *Brachionus* is the highest. Only a small number of species are quite common and occurr in a wide range habitats. Flooding waterbodies have the largest number of taxa. Some amazonian endemic taxa can be found up to 10° north latitude, while others are restricted to the Orinoco River Basin under this latitude. Taxa generally related to coastal regions are restricted to basins near to the Caribbean Sea.

Keywords: **Rotifers, Venezuela, Neotropics, taxonomy, biogeography**.

Resumen

La fauna de rotiferos de Venezuela se revisó a la luz de la literatura existente y observaciones y datos no publicados de los autores. Un total de 268 taxones pertenecientes a 44 géneros se registran para el pais. Los géneros *Lecane, Brachionus* y *Trichocerca* son los más diversos. La taxocenosis consiste de taxones cosmopolitas (68 %), pantropicales (19 %), neotropicales (11 %) y nearticos (2 %). La proporción de taxones endémicos es comparable a otras regiones tropicales donde existe gran endemismo del género *Brachionus*. Sólo unos pocos taxones son comunes y se encuentran en un amplio espectro de hábitats. Los cuerpos de aguas inundables exhiben el mayor número de taxones. Algunos taxones endémicos de la Cuenca del Rio Amazonas pueden encontrarse por encima de los 10° de latitud norte, mientras que otros están restringidos a la Cuenca del Rio Orinoco por debajo de esta latitud. Los taxones generalmente asociados a regiones costeras están restringidos en su distribución a cuencas cercanas al Mar Caribe.

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Introduction

Present knowledge on rotifers from inland waters of Venezuela began with collections of F. Gessner during the memorable German Scientific Expedition to Venezuela in 1952, and the publications of HAUER (1956) and GESSNER (1956). Since that time there have been over twenty-five papers dealing with Venezuelan rotifers (BERZINS 1962; GESSNER 1968; DE RIDDER 1977; INFANTE 1978; MICHELANGELLI et al. 1980; INFANTE 1980; POURRIOT & ZOPPI DE ROA 1981; VÁSQUEZ 1984a, 1984b; DÍAZ & CASTELLANO 1988; MEDINA & VÁSQUEZ 1988; SAUNDERS & LEWIS 1988a, 1988b; VÁSQUEZ & REY 1989; ZOPPI DE ROA et al. 1990; LÓPEZ 1991; VÁSQUEZ et al. 1991; VÁSQUEZ & REY 1992; INFANTE et al. 1993; LÓPEZ 1993; VÁSQUEZ & REY 1993; ZOPPI DE ROA et al. 1993; LÓPEZ & OCHOA 1994; PARDO et al. 1994; INFANTE et al. 1995; LÓPEZ & OCHOA 1995).

Due information on rotifers from Venezuela has greatly increased and many different regions have been studied extensively in the past years, we have undertaken to analize the existing literature and our own unpublished data, in order to provide a complete taxa checklist of rotifers in Venezuelan waterbodies. Likewise, some aspects related to geographical distribution and occurrence of taxa in different habitats are discussed.

Venezuelan hydrological basins

Venezuela is located at North of South America (0°45' - 12°12'N and 59°45' - 73°25'W), with an area of 912,050 km^2, it has a great diversity of inland waterbodies and some special biogeographical features: -a) To the south, it is part of the Amazon Basin, thanks to the Casiquiare River which connects the Orinoco River and Rio Negro; -b) In the East and already from the Caroni River, it is a part of the Guyan Massif, old and long isolated from the rest of South America; -c) In the West, it is related to the Andes mountain chain and part of Central America and all mountains of the Cordillera in the South; -d) In the North, it is the route of colonization of the Caribbean islands and the contact point between marine, brackish and freshwater environments.

Venezuela is conformed by five great hydrographic basins: Orinoco River Basin (OR), Lake Maracaibo Basin (LM), Caribbean Sea Basin (CS), Cuyuni River Basin (CR), River Negro Basin (RN) and a small endorreic basin conformed by Lake Valencia (LV) (ZINCK 1982) (Fig. 1). Venezuelan waterbodies are represented by great rivers of black and clear waters (sensu SIOLI), streams, high mountain lakes, floodplain lakes, ponds, artificial reservoirs, shallow flooding waterbodies and coastal lagoons and brackish waters. Detailed information on Venezuelan hydrological basins and their waterbodies can be found in ZINCK (1982) and CRESSA et al. (1993).

Number of papers

Both the number of publications and waterbodies studied are unevenly distributed over the Venezuelan territory. The greatest hydrological basins (OR, LM and CS) are the best documented, while, the farthest and inaccesible (RC and RN) are still *terra incognita*, as far as rotifers are concerned (Table 1, Fig. 1).

General remarks

The alphabetical list of rotifer taxa recorded for Venezuelan waterbodies is given. Only those taxa identified to species level. Taxa of infrasubespecific rank are listed as proposed by SEGERS (1992). Each name is followed by abbreviations which refers to the basin where they occurred (Fig. 1).

List of rotifer taxa from Venezuelan waterbodies

Anuraeopsis coelata (DE BEAUCHAMP 1932): CS
A. navicula (ROUSSELET 1910): CS, LM, LV, OR
Asplanchna brightwelli (GOSSE 1850): CS, OR
A. sieboldi (LEYDIG 1854): CS, LM, LV, OR
B. angularis (GOSSE 1850): CS, LM, LV, OR
B. angularis pseudolabratus AHLSTROM 1940: CS, LM, OR
B. budapestiensis f. similis (LEISSLING 1914): OR
B. calyciflorus f. amphiceros (EHRB. 1838): LM, OR
B. calyciflorus f. dorcas (GOSSE 1857): OR
B. caudatus BARROIS & DADAY 1894: CS, LV, OR
B. caudatus f. insuetus AHLSTROM 1940: LV, OR
B. caudatus f. personatus AHLSTROM: LM, OR
B. caudatus f. vulgatus AHLSTROM 1940: OR
B. diversicornis (DADAY 1883): OR
B. falcatus ZACHARIAS 1898: CS, LM, LV, OR
B. forficula f. minor VORONKOV 1913: OR
B. gillardi HAUER 1966: OR
B. incertus (HAUER 1953): LV, OR
B. mirus DADAY 1905: OR
B. mirus reductus KOSTE 1972: OR
B. plicatilis (O.F.M. 1786): CS, LM, LV
B. pterodinoides (ROUSSELET 1913): OR
B. quadridentatus f. brevispinus (EHRB. 1832): LM
B. quadridentatus melheni (BARROIS & DADAY 1894): OR
B. rubens (EHRB. 1838): CS, LM, LV, OR
B. urceolaris (O.F.M. 1773): CS, LM, LV, OR
B. variabilis HEMPEL 1896: OR
B. zahniseri AHLSTROM 1934: OR
Cephalodella forficula (EHRB. 1932): CS
C. mira MYERS 1924: OR
Collotheca campanulata (DOBIE 1849): OR
C. tenuilobata (ANDERSON 1889): OR
C. obtusa (GOSSE 1886): CS, LM, OR
C. tesselata (GLASCOTT 1893): OR
Conochilus coenobasis SKORIKOV 1914: OR
C. natans (SELIGO 1900): OR
A. fissa (GOSSE 1851): LM, OR
Ascomorpha saltans BARTSH 1870: CS, OR
A. priodonta (GOSSE 1850): OR
Brachionus ahlstromi (LINDEMAN 1939): LM, OR
B. angularis f. chelonis AHLSTROM 1940: OR
B. bidentatus ANDERSON 1889: OR
B. budapestiensis (DADAY 1885): OR
B. calyciflorus PALLAS 1766: CS, LM, LV, OR
B. calyciflorus f. anuraeiformis (BREHM 1909): CS, LV
B. caudatus f. austrogenitus AHLSTROM 1940: CS, LM, LV, OR
B. caudatus f. majusculus AHLSTROM 1940: LM
B. caudatus provectus AHLSTROM 1940: LV
B. dimidiatus (BRYCE 1931): OR
B. dolabratus HARRING 1913: CS, LM, LV, OR
B. forficula WIERZEJSKI 1891: OR
B. gessneri HAUER 1956: OR
B. havanaensis ROUSSELET 1911: CS, LM, LV, OR
B. mirus angustus (KOSTE 1972): OR
B. patulus macrocanthus (DADAY 1905): CS, LM, OR
B. quadridentatus HERMANN 1783: CS, LM, LV, OR
B. quadridentatus mirabilis (DADAY 1897): CS, LM, OR
B. sessilis VARGA 1951: OR
B. urceolaris amazonica KOSTE 1983: OR
B. voigti HAUER 1961: OR
B. zahniseri reductus HAUER 1956: OR
C. gibba (EHRB. 1832): OR
C. mucronata H.F.M. 1924: OR
Collotheca ornata (EHRB. 1832): OR
Colurella colurus (EHRB. 1830): LV, OR
C. sulcata (STENROOS 1898): OR
C. uncinata (O.F.M. 1773): CS, LM
C. dossuarius (HUDSON 1875): LM, OR
C. unicornis ROUSSELET 1892: OR

Dicranophorus caudatus brasziliensis KOSTE 1972: OR
D. epicharis HARRING & MYERS 1928: LV, OR
D. kostei POURRIOT & ZOPPI DE ROA 1981: OR
D. propatula macrodactyla (HAUER 1965): CS, LM, OR
Epiphanes clavulata (EHRB. 1832): OR
Euchlanis dilatata EHRB. 1832: CS, LM, OR
E. dilatata lucksiana (HAUER 1930): LV
E. incisa f. mucronata (AHLSTROM 1934): CS, OR
E. triquetra EHRB. 1838: LM, OR
F. longiseta var. limnetica (ZACHARIAS 1891): CS, OR
F. opoliensis (ZACHARIAS 1891): LM, LV, OR
F. terminalis (PLATE 1886): CS, OR
Hexarthra fennica (LEVANDER 1892): CS, LM
H. intermedia braziliensis (HAUER 1953): CS, LM, LV, OR
K. cochlearis (GOSSE 1851): CS, LM, LV, OR
K. cochlearis f. angulifera (LAUTERBORN 1900): OR
K. nhamunda KOSTE 1983: OR
K. testudo (EHRB. 1832): OR
K. tropica f. reducta (FADEEW 1927): CS, LM, OR
L. aeganea HARRING 1914: LM, OR
L. arcuata (BRYCE 1891): CS
L. bulla (GOSSE 1851): CS, LM, LV, OR
L. cornuta (O.F.M. 1786): CS, LM, LV, OR
L. curvicornis MURRAY 1913: CS, LM, LV, OR
L. doryssa HARRING 1914: OR
L. elsa HAUER 1931: OR
L. furcata (MURRAY 1913): CS, LV, OR
L. grandis (MURRAY 1913): CS
L. hamata (STOKES 1896): CS, LM, LV, OR
L. hornemanni (EHRB. 1834): CS, LM, LV, OR
L. lauterborni HAUER 1924: OR
L. levistyla (OLOFSSON 1817): OR
L. ludwigi (EKSTEIN 1883): LM, LV, OR
L. luna (O.F.M. 1776): CS, LM, LV, OR
L. melini THOMASSON 1953: OR
L. monostyla (DADAY 1897): CS, OR
L. nana (MURRAY 1913): CS, LV
L. papuana (MURRAY 1913): CS, LM, LV, OR
L. proiecta HAUER 1956: OR
L. pustulosa MYERS 1938: OR
L. quadridentata (EHRB. 1832): CS, LM, OR
L. rhytida HARRING & MYERS 1926: LM, OR
L. sagula HARRING & MYERS 1926: OR
L. signifera f. ploenensis (VOIGT 1902): CS, LM, OR
L. sybina HARRING 1914: OR
D. claviger (HAUER 1965): OR
D. claviger venezueliensis POURRIOT & ZOPPI DE ROA 1981: OR
Dipleuchlanis propatula (GOSSE 1886): CS, LM,
Dissotrocha aculeata (EHRB. 1832): OR
D. macrostyla (EHRB. 1832): OR
E. macrourus (BARROIS & DADAY 1894): LM, LV, OR
E. incisa CARLIN 1939: CS, LM, OR
E. meneta MYERS 1930: OR
Filinia longiseta (EHRB. 1834): CS, LM, LV, OR
F. longiseta var. saltator (GOSSE 1886): LM, OR
F. pejleri HUTCHINSON 1964: LM, OR
Floscularia ringens (LINNÉ 1758): OR
H. intermedia WISZNIEWSKI 1929: CS, LM, OR
Itura myersi WULFERT 1935: LM, OR
Keratella americana CARLIN 1943: CS, LM, LV, OR
K. hiemalis (CARLIN 1943): OR
K. lenzi HAUER 1954: CS, LM, OR
K. procurva (THORPE 1891): LV, OR
K. tropica (APSTEIN 1907): CS, LM, LV, OR
Lecane aculeata (JAKUBSKI 1912): LM
L. amazonica MURRAY 1913: LM, OR
L. arcula HARRING 1914: CS, LM, LV
L. closterocerca (SCHMARDA 1859): CS, LV, OR
L. crepida HARRING 1914: CS, LM, LV, OR
L. decipiens MURRAY 1913: CS
L. elongata HARRING & MYERS 1926: OR
L. eutarsa HARRING & MYERS 1926: OR
L. galeata (BRYCE 1892): OR
L. haliclysta HARRING & MYERS 1926: LM, OR
L. hastata (MURRAY 1913): CS, Lm, LV, OR
L. inopinata HARRING & MYERS 1926: LV, OR
L. leontina (TURNER 1892): CS, LM, LV, OR
L. ligona DUNLOP 1901: OR
L. ludwigi var. laticaudata (HAUER 1938): LM, OR
L. lunaris (EHRB. 1832): CS, LM, LV, OR
L. mitis HARRING & MYERS 1926: OR
L. myersi SEGERS 1993: OR
L. obtusa (MURRAY 1913): LM, OR
L. pertica HARRING & MYERS 1926: LM, OR
L. punctata (MURRAY 1913): LM, LV, OR
L. pyriformis (DADAY 1905): CS, LM, LV, OR
L. rhenana HAUER 1929: OR
L. rugosa HARRING 1914: CS, OR
L. scutata (HARRING & MYERS 1926): CS, LM, OR
L. stenroosi (MEISSNER 1908): LM
L. stichaea HARRING 1913: OR

L. thalera HARRING & MYERS 1926: CS, LM, LV, OR
L. unguitata (FADEEW 1925): OR
L. benjamini braziliensis KOSTE 1972: OR
L. dactyliseta (STENROOS 1898): LM, OR
L. heterodactyla FADEEW 1925: OR
L. latusinus (HILGENDORF 1899): OR
L. ovalis (O.F.M. 1786): LM, OR
L. patella oblonga (EHRB. 1834): LV, OR
L. princisi (BERZINS 1943): OR
L. rhomboides (GOSSE 1886): CS, OR
L. triptera (EHRB. 1830): CS, OR
Lindia torulosa DUJARDIN 1841: LV
M. longipes MYERS 1934: OR
Manfredium eudactylotum (GOSSE 1886): CS, OR
Mytilina acantophora HAUER 1938: OR
M. bisulcata (LUCKS 1912): CS, LM, OR
M. mucronata var. spinigera (EHRB. 1832): LM
M. ventralis f. macracantha (GOSSE 1886): CS, LM, OR
Notommata collaris EHRB. 1832: OR
N. copeus EHRB. 1832: OR
Philodina roseola EHRB. 1832: LV
Platyias leloupi (GILLARD 1957): OR
P. quadricornis (EHRB. 1832): CS, LM, LV, OR
Ploesoma lenticulare HERRICK 1885: OR
Polyarthra dolichoptera IDELSON 1925: OR
P. longiremis (CARLIN 1943): OR
P. vulgaris CARLIN 1943: CS, LM, LV, OR
Proales fallaciosa WULF 1937: OR
P. melicerata melicerta (EHRB. 1832): LV
Rotaria neptunia (EHRB. 1832): LM, LV, OR
R. tridens (MONTET 1915): LV
Sinantherina semibullata (THORPE 1889): OR
Squatinella leydigi leydigi ZACHARIAS 1886: OR
Synchaeta pectinata EHRB. 1832: OR
Testudinella ahlstromi (HAUER 1956): OR
T. mucronata (GOSSE 1886): OR
T. patina f. trilobata ANDERSON & SHEPHARD 1892: OR
T. patina (HERMANN 1783): CS, LM, LV, OR
Tridentata amazonica THOMASSON 1971: OR
Trichocerca bicristata bicristata (GOSSE 1887): CS, OR
T. braziliensis (MURRAY 1913): OR
T. cavia (GOSSE 1886): OR
T. collaris (ROUSSELET 1896): OR
T. dixon-nutalli JENNINGS 1903: OR
T. flagellata HAUER 1937: OR
T. iernis (GOSSE 1887): LM, OR
T. insignis (HERRICK 1885): OR
L. thienemanni (HAUER 1928): CS, LM, OR
L. ungulata (GOSSE 1887): CS, LM, OR
Lepadella acuminata (EHRB. 1834): OR
L. cristata (ROUSSELET 1893): OR
L. imbricata HARRING 1914: LM
L. heterostyla (MURRAY 1913): LM
L. minuta (MONTET 1918): OR
L. patella (O.F.M. 1786): CS, LM, OR
L. patella similis (LUCKS 1912): CS, LM, OR
L. pterygoides (DUNLOP 1897): OR
L. rhomboides f. carinata (DONER 1943): OR
Liliferotrocha subtilis (RODEWALD 1940): LV
Macrochaetus collinsi (GOSSE 1867): OR
M. sericus (THORPE 1893): LM, OR
Monommata maculata HARRING & MYERS 1926: OR
M. macrocera (JENNING 1894): OR
M. ventralis (EHRB. 1832): OR
M. ventralis var. brevispinus (EHRB. 1832): OR
M. ventralis michelangellii TURNER & REID 1988: OR
N. pachyura (GOSSE 1886): OR
Plationus patulus (O.F.M. 1786): CS, LM, LV, OR
P. quadricornis brevispina (DADAY 1905): LM, OR
P. truncatum (LEVANDER 1894): OR
P. euryptera (WEIERZEJKI 1893): CS
P. remata (SKORIKOV 1896): CS, LM, LV, OR
Pompholyx sulcata (HUDSON 1885): OR
Ptygura libera MYERS 1934: OR
P. tacita EDMONDSON 1940: OR
R. rotatoria (PALLAS 1766): LM, LV, OR
Scaridium longicaudum (O.F.M. 1786): OR
S. spinosa (THORPE 1893): OR
S. mutica tridentata (FRESENIUS 1858): OR
S. stylata WIERZEJSKI 1893: OR
T. mucronata hauerensis (GILLARD 1967): LM, OR
T. ohlei KOSTE 1972: OR
T. parva (TERNETZ 1892): OR
T. parva var. semiparva (HAUER 1838): OR
T. patina dendradena (DE BEAUCHAMP 1955): LM, OR
T. bicristata f. mucosa (STOKES 1896): OR
T. bidens (LUCKS 1912): OR
T. capucina WIERZEJSKI & ZACHARIAS: OR
T. chattoni DE BEAUCHAMP 1907: OR
T. cylindrica (IMHOF 1891): OR
T. elongata (GOSSE 1886): OR
T. gracilis (TESSIN 1890): OR
T. inermis (LINDER 1904): OR
T. longiseta (SCHRANK 1802): OR

T. montana (HAUER 1931): OR
T. ornata (MYERS 1934): OR
T. rattus (O.F.M. 1776): OR
T. similis (WIERZEJSKI 1893): CS, LM, OR
T. stylata (GOSSE 1851): LV, OR
T. tigris (O.F.M. 1786): OR
Trichotria tetractis tetractis (EHRB. 1830): OR
T. myersi (HAUER 1931): OR
T. pusilla (LAUTERBORN 1896): CS, LM, LV, OR
T. ruttneri (DONNER 1953): CS, LM, OR
T. similis grandis (HAUER 1965): CS, OR
T. tenuior (GOSSE 1886): OR
T. weberi JENNINGS 1903: CS
Tripleuchlanis plicata (LEVANDER 1894): CS, LV, OR

In total 268 taxa belonging to 44 genera are known from the Venezuelan waterbodies. The genera *Lecane* (57 taxa), *Brachionus* (45 taxa) and *Trichocerca* (30 taxa) are the best represented. Genera such as *Aspelta, Atrochus, Cyrtonia, Elosa, Eosphora, Floscularia, Gastropus, Harringia, Lacinularia, Resticula, Octotrocha, Proalides*, and *Stephanoceros*, found in another localities of South America (KOSTE & PAGGI 1982; PAGGI & KOSTE 1995), have not yet been recorded from Venezuela, probably as a consequence of the scarse number of studies on rotifers associated to benthos, peryphyton and aquatic vegetation.

The knowledgement about of the Bdelloidea is very limited. The first record was made by HAUER (1956) and only occasional records can be found in literature (MICHELANGELLI et al. 1980; INFANTE 1980; VÁSQUEZ 1984a; ZOPPI DE ROA et al. 1993). The Bdelloidea recorded genera from Venezuela are: *Dissotrocha, Philodina* and *Rotaria*. Further studies are clearly required.

Biogeographical aspects

Some recorded taxa from Venezuela were not included in the most recent checklist of Neotropical rotifer fauna (PAGGI & KOSTE 1995) or in the previous review (KOSTE & PAGGI 1982). These taxa are: *Brachiounus budapestiensis f. similis, B. forficula, B. forficula minor, B. diversicornis, Keratella cochlearis f. angulifera, K. hiemalis, K. testudo, K. tropica reducta, Lecane aeganea, L. elongata, L. lauterborni, L. ligona, L. sagula* and *Mytilina ventralis michelangellii* (SAUNDERS & LEWIS 1988a, 1988b; ZOPPI DE ROA et al. 1990; VÁSQUEZ & REY 1992; LÓPEZ 1993; ZOPPI DE ROA et al. 1993; LÓPEZ & OCHOA 1994, 1995).

The following records are new to Venezuela: *Brachionus dimidiatus; Collotheca ornata; Lecane lauterborni* and *Platyias leloupi*. These were collected by E. VÁSQUEZ in Lake Principal, Lake Carmera, Mucurita Stream and Macanilla Stream, Apure State (OR).

The rotifer taxocoenosis consists mainly of cosmopolitan (68 %) and pantropical (19 %) taxa, however, a number of taxa with limited or remarkable distribution ranges have been also found.

Neotropical taxa.

Taxa with a distribution encompassing the Neotropical region were found in a proportion of 11 %. Among, the genera *Brachionus* and *Lecane* exhibit the highest number of taxa.

The neotropical taxa are: *Brachionus caudatus insuetus, B. dolabratus, B. gessneri, B. gillardi, B. havanaensis, B. mirus, B. mirus angustus, B. mirus reductus, B. urceolaris amazonica, B. voigti, B. zahniseri, B. zahniseri reductus, Dicranophorus caudatus braziliensis, D. claviger, D. claviger venezueliensis, Filinia longiseta saltator, Keratella nhamunda, Lecane amazonica, L. eutarsa, L. melini, L. proiecta, Lepadella benjamini braziliensis, Mytilina ventralis michelangelli, Sinantherina spinosa, Testudinella ahlstromi, T. ohlei ohlei, Trichocerca tridentata amazonica* and *T. similis grandis*. Among, *D. claviger venezueliensis* is known only from Venezuela (POURRIOT & ZOPPI DE ROA 1981).

The proportion of endemic taxa (Neotropical taxa) in the Venezuelan rotifer fauna is higher than recorded values for African waterbodies (DE RIDDER 1987; SEGERS 1992; SEGERS et al. 1993) but comparable to Australia (SHIEL & KOSTE 1983: 15 %) and similar to other Neotropical regions (BRANDORFF et al. 1982: 11 %), where high endemicity in the genus *Brachionus* is typical.

Neartic-Paleartic Taxa

In the Venezuelan rotifer fauna five taxa (*Keratella cochlearis f. angulifera, K. hiemalis, Lecane lauterborni, L. ligona, L. sagula*) from the Neartic-Paleartic region have been recorded. Of these *L. sagula* is only known from U.S.A. and Venezuela (SEGERS 1995).

Occurrence in Venezuelan Waterbodies

Although the number of papers on rotifers may be still insufficient to provide a complete understanding on their geographical distribution in Venezuela, two interesting trends emerges from a preliminary analysis on distribution of the best known genera *Lecane* and *Brachionus*.

1. While such endemic amazonian taxa as *Brachionus ahlstromi*, and *Lecane amazonica* can be found up to 10° north latitude, other species such as *Brachionus gessneri, B. mirus, B. voigti, B. zahniseri, Lecane melini* and *L. proiecta* are restricted to the Orinoco River Basin, and usually are found only under 10° north latitude (Figs. 2-3).
2. Taxa such as *Lecane arcula, L. grandis, L. nana, L. thalera, L. stenroosi* and *Brachionus plicatilis* are limited to the basins nearest to the Caribbean Sea (Figs. 2-3). With the exception of *L. arcula*, these taxa are related to coastal regions (KOSTE 1978; SEGERS 1995). All of these have not been recorded in OR, including the coastal region of Atlantic Ocean (VÁSQUEZ & REY 1989).

Of the total rotifer taxa recorded to Venezuela, a large proportion have rarely been encountered in the 99 waterbodies studied, according to literature and our personal observations and unpublished data (Fig. 1). Only a small number of species are quite common and occurr in a wide range habitats. The taxa which occurred in over 50 % of sampled waterbodies are the following: *Brachionus havanaensis, Filinia longiseta, Keratella americana, Lecane bulla, L. leontina, Plationus patulus, Platyias quadricornis* and *Polyarthra vulgaris*.

Available information on location of taxa was grouped in four habitat types: Lakes, Ponds and Reservoirs (LPR); Flooding waterbodies (FW); Rivers and Streams (RS) and Coastal Lagoons (CL). Table 2 shows the list of taxa, which occurred in over 50 % of at least one habitat type. FW have the largest number of taxa. The most common taxa (over 50 % of localities) in this habitat type were: *Brachionus dolabratus, B. falcatus, B. havanaensis, Plationus patulus, Keratella americana, Lecane bulla, L. leontina, Platyias quadricornis*, and *Polyarthra vulgaris*. In LPR, *Keratella americana* and *Lecane bulla* were the most common. While in RS and CL, only *Lecane bulla* and *Brachionus plicatilis*, respectively, were over 50 % of occurrence.

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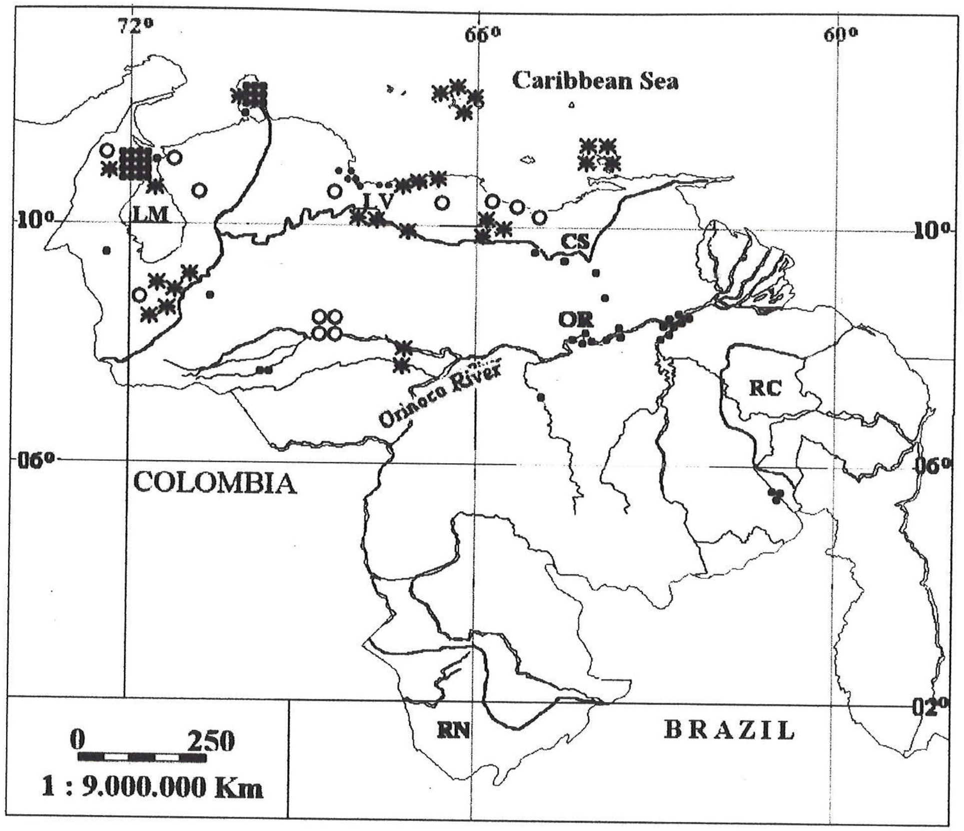
Table 1: Distribution of papers on the Venezuelan rotifers and sampled waterbodies on hydrological basins. (Including unpublished data).

Basin	**Area (km²)**	**Sampled waterbodies**	**References**
Orinoco River	1.100.000	38	HAUER (1956) MEDINA & VÁSQUEZ (1988) MICHELANGELLI et al. (1980) PARDO et al. (1994) POURRIOT & ZOPPI DE ROA (1981) SAUNDERS & LEWIS (1988a, b) VÁSQUEZ (1984a, b) VÁSQUEZ et al. (1991) VÁSQUEZ & REY (1989, 1992, 1993) ZOPPI DE ROA et al. (1990) ZOPPI DE ROA et al. (1993)
Lake Maracaibo	90.000	24	DE RIDDER (1977) DÍAZ & CASTELLANO (1988) GESSNER (1956) HAUER (1956) LÓPEZ (1991, 1993) LÓPEZ & OCHOA (1994, 1995) ZOPPI DE ROA et al. (1993)
Caribbean Sea	80.000	36	DE RIDDER (1977) HAUER (1956) INFANTE et al. (1993) INFANTE et al. (1995) LÓPEZ & OCHOA (1994) ZOPPI DE ROA et al. (1993)
River Negro	47.000	-	-
Cuyuni River	40.000	-	-
Lake Valencia	2.530	2	BERZINS (1962) GESSNER (1968) HAUER (1956) INFANTE (1978, 1980)

Table 2: Rotifers occurring in > 50 percent of at least one type of habitats in 99 venezuelan waterbodies. Numbers are percentages of occurrences in a particular habitat type (LPR = Lakes, Ponds and Reservoirs; FW = Flooding waterbodies; RS = Rivers and Streams; CL = Coastal Lagoons).

Taxa	**LPR**	**FW**	**RS**	**LC**
B. angularis	40	60	<25	-
B. dolabratus	<25	70	<25	-
B. falcatus	53	70	25	-
B. havanaensis	67	80	<25	-
B. plicatilis	-	-	-	100
F. longiseta	60	40	38	-
K. americana	73	90	44	30
L. bulla	80	80	94	-
L. cornuta	33	60	35	<25
L. leontina	40	80	56	-
L. papuana	<25	60	29	-
P. patulus	67	80	38	-
P. quadricornis	60	80	51	-
P. vulgaris	60	80	38	-
T. similis similis	33	60	<25	-
Total taxa over 50 %	8	13	3	1



* References: HAUER 1956; DE RIDDER 1977; INFANTE 1978, 1980; DÍAZ & CASTELLANO 1988; SAUNDERS & LEWIS 1988a, b; INFANTE et al. 1993, 1995.

● Publications of authors.

○ Unpublished data.

Fig. 1:
Location of hydrological basins and waterbodies sampled for rotifers in Venezuela (CR = River Cuyuní Basin; LM = Lake Maracaibo Basin; LV = Lake Valencia Basin; OR = Orinoco River Basin; RN = River Negro Basin).

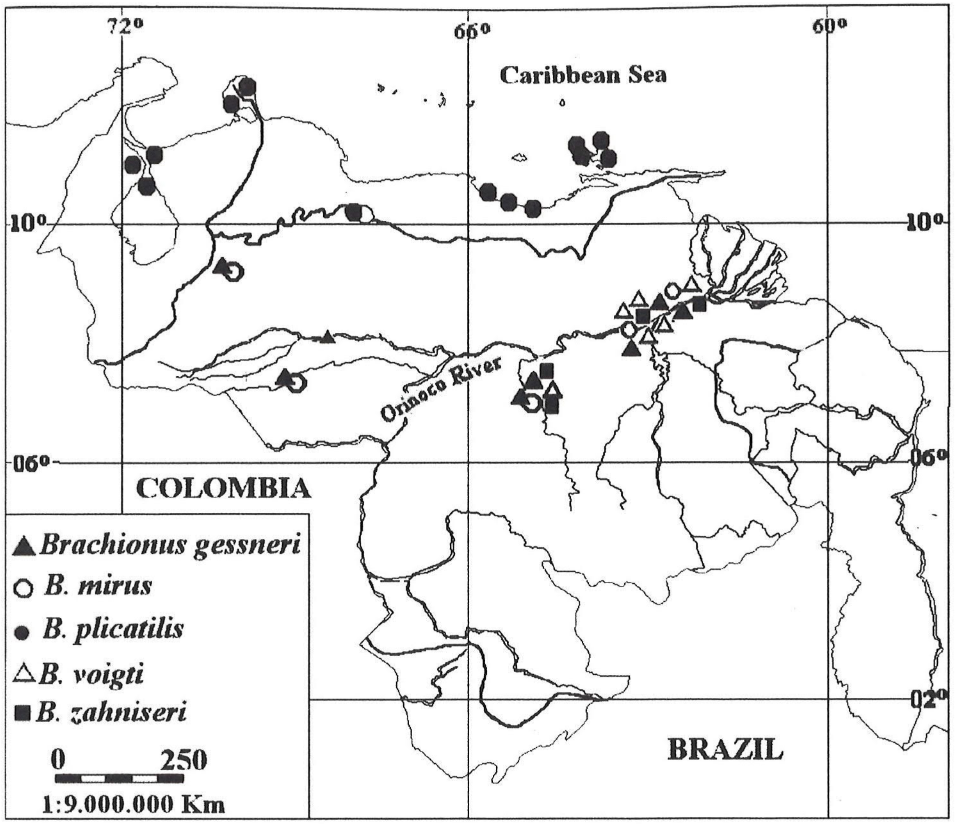


Fig. 2:
Distribution of some *Brachionus* species in Venezuela.

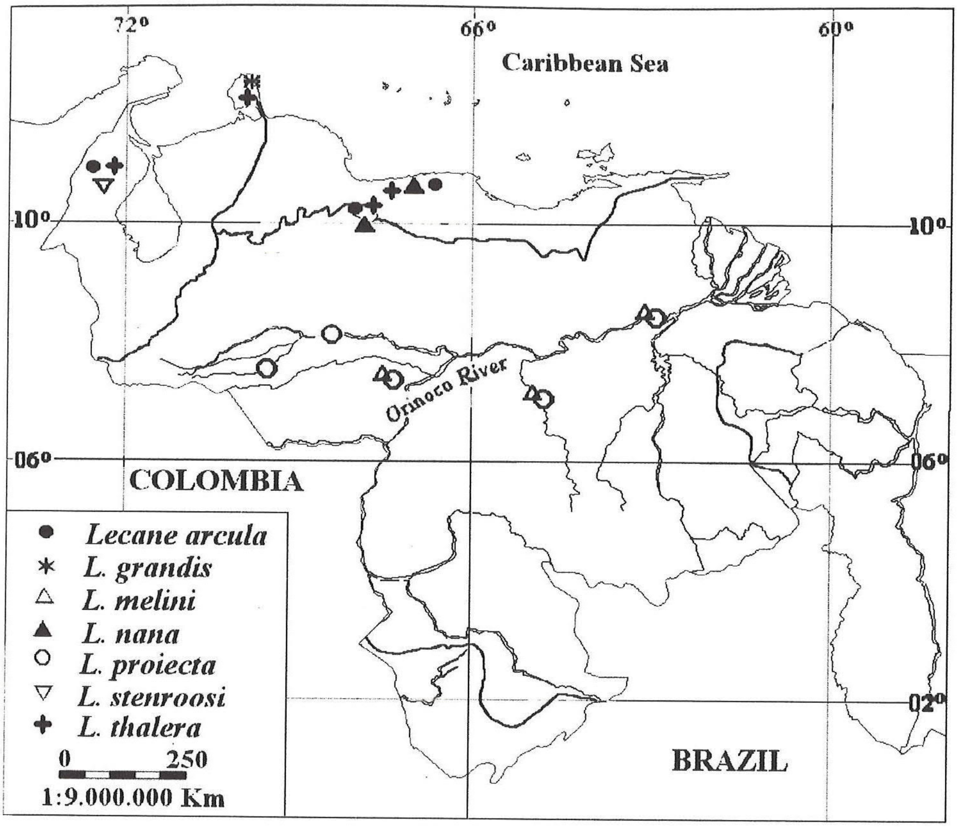


Fig. 3:
Distribution of some *Lecane* species in Venezuela.